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| APPLICATION NO. | FILING DATE | FIRST NAMED INVENTOR | ATTORNEY DOCKET NO. | CONFIRMATION NO. |
|-----------------|-------------|----------------------|---------------------|------------------|
| 10/630,520 | 07/30/2003 | Barry M. Verdegan | 4191-00308 | 9250 |

26753 7590 12/28/2006
ANDRUS, SCEALES, STARKE & SAWALL, LLP
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| EXAMINER |
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MATZEK, MATTHEW D

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| ART UNIT | PAPER NUMBER |
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1771

| SHORTENED STATUTORY PERIOD OF RESPONSE | MAIL DATE | DELIVERY MODE |
|--|------------|---------------|
| 3 MONTHS | 12/28/2006 | PAPER |

Please find below and/or attached an Office communication concerning this application or proceeding.

If NO period for reply is specified above, the maximum statutory period will apply and will expire 6 MONTHS from the mailing date of this communication.

| | | | |
|------------------------------|-------------------------------|---------------------------------|--|
| Office Action Summary | Application No. 10/630,520 | Applicant(s) VERDEGAN ET AL. | |
| | Examiner Matthew D. Matzek | Art Unit 1771 | |

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 10 October 2006.
- 2a) ☐ This action is FINAL. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 105-113 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 105-113 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 22 April 2004 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

Continued Examination Under 37 CFR 1.114

1. A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on 10/10/2006 has been entered.

Response to Amendment

2. The amendment dated 10/10/2006 has been entered into the Record. Claims 1-104 have been canceled. New claims 105-113 are currently active. The new claims contain no new matter. The previously applied art rejections have been withdrawn due to all previous claims being canceled.

Claim Rejections - 35 USC § 102

The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.

3. Claims 106-110 is rejected under 35 U.S.C. 102(b) as being obvious over Fischer (US 5,800,706).

a. Fischer teaches the creation of a porous material made from nanofiber packed beds by blending nanofibers with scaffold particulates having larger dimensions to prevent the nanofiber bed from collapsing (Abstract). The nanofibers preferably have diameters less than 500 nanometers (col. 4, lines 25-31). The nanofibers are made of carbon (col. 4, lines 54-67). The scaffold particulate is preferably a fiber (col. 7, lines 26-30) and preferably has a diameter of greater than 1 micron (col. 7, lines 11-19). The

scaffold particulates may be polymeric, inorganic, glass or metallic and may have the same or different composition than the nanofiber (col. 7, lines 40-44). One embodiment of the invention comprises a third particle or fiber (col. 10, lines 42-47).

b. The applied reference provides for inorganic coarse fibers (i.e. ceramic) and carbon nanofibers. Ceramics are inherently hydrophilic and oleophobic and carbon nanofibers are hydrophobic and oleophilic. This provides for the instantly claimed wettabilities of claim 106 when the packed bed is used with an oil-based liquid and claim 107 when the liquid is water-based. Claim 108 is rejected as ceramics are insulative and carbon fibers are electrically conductive. Their combination as outlined above would provide for the instantly claimed localized electric field. Claim 109 is rejected as the packed bed may be uniform distribution of scaffold fibers and nanofibers (col. 9, lines 23-30).

c. Claim 110 is rejected as nanofiber constructs may congregate and form web-like domains (col. 9, lines 34-36) within the scaffold support structure.

Claim Rejections - 35 USC § 103

The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.

4. Claims 105 and 111-113 are rejected under 35 U.S.C. 103(a) as being obvious over Fischer (US 5,800,706). The invention of Fischer is silent as to a third set of coarse fiber to provide additional scaffolding support in particular to the larger microfibers.

a. It would have been obvious to one of ordinary skill at the time of the invention to have made the packed bed of Fischer with a third grouping of coarse fibers, larger than

those previously mentioned with the motivation of forming a packed bed structure from nanofibers with enhanced fluid flow characteristics as a result of the scaffolding effect provided by the added coarse fibers (col. 2, lines 34-44). This scaffolding effect would be further enhanced by providing a third set of larger diameter fibers with the most preferred size of greater than 5 microns (col. 7, lines 15-19). The largest fibers would serve as a scaffold in the same manner as the aforementioned scaffold particulates support the nanofibers. It would have been obvious to add the extra grouping of fibers as it has been held that mere duplication of essential working parts of a device involves only routine skill in the art. *St. Regis Paper Co. v. Bemis Co.*, 193 USPQ 8. (i.e. larger fibers to act as a scaffold for the smaller fibers and provide enhanced filtering capabilities).

b. Claims 111-113 are rejected as nanofibers would necessarily behave in the claimed manner based upon the methods used in the manufacturing process used to make the packed beds (Examples 4 and 5). The coarse fiber act as a scaffold for the nanofibers, therefore the structure of claims 105 and 111 are met. The structure of claim 112 is met as it is reasonable to presume that some of the some of the nanofibers will cling to the coarse fiber, especially if they are of the same composition. The structure of claim 113 is met as the method of making the packed bed would necessarily result in a uniform dispersion of the nanofibers throughout the packed bed.

Response to Arguments

5. Applicant's arguments with respect to claims 105-113 have been and those that have been specifically directed to the Fischer reference will be addressed in this Office Action.

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6. Applicant argues that designated wettabilities or carbon fibers are not inherent because of their changability and thus the inherent characteristic does not necessarily flow from the applied teaching. Applicant has shown that through a specific treatment to carbon fibers the contact angle may be changed thereby changing its wettability. Examiner has taken Applicant's argument into consideration, however finds it unpersuasive. While a carbon fiber may be treated to manipulate its contact angle the applied reference teaches the creation process of carbon fibers (col. 4, lines 41-52) which results in oleophilic properties and mentions the creation of carbon nanofibers (col. 5) which also results in oleophilic properties. The applied reference fails to mention the surface treatment of the coarse carbon fibers and as such the fibers would have the naturally present surface characteristic of being oleophilic. Without a specific teaching that the coarse carbon fibers have been treated to change their wettability it is reasonable to presume that they would behave as a virgin carbon fiber. There is no requirement that a person of ordinary skill in the art would have recognized the inherent disclosure at the time of invention, but only that the subject matter is in fact inherent in the prior art reference. *Schering Corp. v. Geneva Pharm. Inc.*, 339 F. 3d 1373, 1377, 67 USPQ2d 1664, 1668 (Fed. Cir. 2003).

7. Applicant argues that Fischer fails to teach a continuous nanofiber portions extending from one face to the other and cites an embodiment which provides for a higher concentration of nanofibers at one face and a thin layer of nanofibers at the bottom portion or within the packed bed structure. Examiner agrees that Applicant has accurately described one embodiment set forth by Fischer. Applicant is directed to another embodiment described by Fischer, which provides for uniform distribution of nanofibers throughout the packed bed (col. 9, lines 15-30). This embodiment provides for the structural limitations set forth in claim 109.

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Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Matthew D. Matzek whose telephone number is (571) 272-2423. The examiner can normally be reached on 8:30 am - 5:00 pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Terrel Morris can be reached on (571) 272-1478. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

Mdm *MDM*

Norca
Norca L. Torres-Velazquez
Primary Examiner
Art Unit 1771

12/19/06